

Rejection under 35 U.S.C. § 112, second paragraph.

Claims 26-47 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctively claim the subject matter which the applicant regards as the invention.

Claim 26 and claims 44-46 are rejected for using technically incorrect terms. Without admitting the propriety of the rejection, applicants have amended the claims in accordance with the Examiner's suggestions in an effort to expedite prosecution. Applicants, therefore request the rejection be withdrawn.

The use of the term "co-ligands" is rejected for being allegedly indefinite.

The applicants respectfully remind the Examiner that an applicant may be his or her own lexicographer, defining terms as he or she wishes (see Intellicall, Inc. v. Phonometrics, Inc., 21 USPQ 2d 1383 (Fed. Cir. 1992)). 35 U.S.C. §112, second paragraph, requires the claims particularly pointing out and distinctively claiming the subject matter which the applicant regards as his invention. Applicants respectfully point out that page 8, line 15 to page 9, line 3 of the specification states that:

Suitable ligands are well known in the art and include, but are not limited to, NH₂; pyridine; pyrazine; isonicotinamide; imidazole; bipyridine and substituted derivatives of bipyridine; phenanthrolines, particularly 1,10-phenanthroline (abbreviated phen) and substituted derivatives of phenanthrolines such as 4,7-dimethylphenanthroline and the compounds disclosed herein; dipyrrophenazine; 1,4,5,8,9,12-hexaazatriphenylene (abbreviated hat); 9,10-phenanthrenequinone diimine (abbreviated phi); 1,4,5,8-tetraazaphenanthrene (abbreviated tap); 1,4,8,11-tetra-azacyclotetradecane (abbreviated cyclam). In some embodiments, porphyrins and substituted derivatives of the porphyrin family may be used.

As argued previously, the applicants submit that one of skill in the art is well familiar with the term "ligand" as it relates to transition metal complexes. See for example the definition of ligand, page 337, in Grant & Hackh's Chemical Dictionary, McGraw Hill

Book Company, 1987 (a copy of which was enclosed as Exhibit B with the amendment filed 20 September 1999). See also Chapter 2, Introduction to Ligands and Complexes, in Advanced Inorganic Chemistry, Fifth Ed., Cotton & Wilkinson, John Wiley & Sons, 1988, pp 35-83 (a copy of which was enclosed as Exhibit C with the amendment filed 20 September 1999; see particularly the first sentence of page 36).

The applicants respectfully remind the Examiner that the standard for §112 enablement is that one skilled in the art would be able to make and use the description of the invention to make and use the claimed invention without undue experimentation. "An inventor need not, however, explain every detail since he is speaking to those skilled in the art." DeGeorge v. Bernier, 226 USPQ 758, 762 (Fed. Cir. 1985). Accordingly, the applicants submit that the term "ligand" is not indefinite as the term is well understood by those in the art.

The Examiner is respectfully reminded that as outlined in M.P.E.P. § 2173.04, "breadth of a claim is not to be equated with indefiniteness." As the Examiner agrees, the term "ligand" is well known in the art. Applicants, therefore request the rejection be withdrawn.

Claims 26 and 27 are rejected because the Markush groups are improperly formulated. Claims 26 and 27 have been cancelled. Therefore, the rejection is moot.

Claims 28, 29, 32, 35, 38 and 41-42 are rejected because the term "substitution group" is allegedly incorrect. Claims 28, 29, 32, 35, 38 and 41-42 have been cancelled. Therefore the rejection is moot.

Claims 26-43 are rejected for containing subject matter which is non-elected. Claims 26-43 have been cancelled. The remaining claims, 44-49, are drawn to the original

restriction in which Z comprises nucleic acid moieties. Applicants, therefore request the rejection be withdrawn.

Claims 26 and 27 are rejected because the "term substituted aromatic group lacks an upper bound." Claims 26 and 27 have been cancelled. Accordingly, the rejection is moot.

Claims 26-47 are rejected for being indefinite because the attachment points have not been defined. As appreciated by those in the art, attachment can occur at a variety of positions on the Z substituent. Applicants respectfully draw the examiner's attention to the specification on pages 24-32 and structures 9-12 which depict the attachment of a 3-acetylene-phenanthroline via the 5 position of the aromatic base, uracil. The specification on page 13, lines 7-15 provides for the attachment to other positions on bases as well. In addition, the specification on page 25, scheme VI, and on page 32, compounds 6-9 depict other points of attachment. Applicants request withdrawal of the rejection.

Rejection under 35 U.S.C. § 112, first paragraph.

Claims 26-47 are rejected under 35 U.S.C., first paragraph. The Examiner has two main points; first, that the specification is not enabling, and secondly that it does not fulfill the written description requirement.

As to the first point, the Examiner admits that substituted nucleosides, substituted nucleotides, substituted nucleoside phosphoramidates and nucleic acid sequences, including substituted nucleosides are enabled. As the amended claims are directed to these moieties, the rejection should be withdrawn.

As to the written description rejection, unlike the "enablement" requirement, the "written description" requirement of 35 U.S.C. §112, first paragraph is not concerned with

support commensurate with the breadth of the claims. The essential purpose of the written description requirement is to show the possession of the invention as of the filing date as a *prima facie* date of invention. In re Smith, 481 F.2d 910, 178 U.S.P.Q. 620,623 (CCPA 1973). Accordingly, the specification is required to contain a statement that adequately describes the invention as claimed. However, the invention need not be described in *ipsis verbis* in order to satisfy the description requirement. See In re Lukach, Olson, and Spurlin, 169 U.S.P.Q. 795, 796 (CCPA 1971). It is sufficient to satisfy the written description requirement if the

specification contains a statement of appellant's invention which is as broad as appellant's broadest claims . . .

In re Robins, 420 F.2d 452, 166 U.S.P.Q. 552, 555 (CCPA 1970).

It is only required, for example, that the specification describe the invention sufficiently for those of ordinary skill in the art to recognize that the applicant invention the subject matter he now claims.

In re Voss, 557 F.2d 812, 194 U.S.P.Q. 267, 271 (CCPA 1977).

In view of the evidentiary function of the written description requirement and the relative ease with which it is met, it is not surprising that description requirement must be found, specifically or inherently, within the specification and original claims.

As outlined in M.P.E.P. §2163.04, the Examiner has the initial burden of presenting evidence or reasons why those of skill in the art would not recognize in the disclosure a description of the invention defined by the claims. This the Examiner has not done, and the rejection should be withdrawn.

The Examiner considers claims 26-47 to represent subject matter which would require undue experimentation by the ordinary practitioner to reduce the invention to practice.

As argued previously, applicants respectfully draw Examiner's attention to M.P.E.P. §2164.01 and in In re Wands, 8 USPQ 2d 1400 (Fed. Cir. 1988), the factors for consideration are:

- (1) The quantity of experimentation necessary (time and expense);
- (2) The amount of direction or guidance presented;
- (3) The presence or absence of working examples of the invention;
- (4) The nature of the invention;
- (5) The state of the prior art;
- (6) The relative skill of those in the art;
- (7) The predictability or unpredictability of the art; and
- (8) The breadth of the claims.

All of these factors must be evaluated together; it is not sufficient, as the Examiner has done, to focus on one factor to the exclusion of the others.

As regards the first factor, the quantity of experimentation in the present invention necessary to make the claimed compounds, the applicants submit that the quantity of experimentation is not great. Palladium-mediated cross coupling reactions are well known to be versatile; thus the quantity of experimentation supports a finding of enablement.

As regards the second factor, the amount of direction or guidance presented in the specification is high.

As regards the third factor, the presence or absence of working examples of the invention, the application contains examples of the addition of aromatic groups and substituted aromatic groups. Thus the presence of these working examples supports a finding of enablement.

As regards the fourth factor, the nature of the invention, the invention is directed to the generation and use of 1,10-phenanthroline derivatives substituted at the 3-and/or 8-positions. Once the inventors have shown how to derivatize the 3-and 8-positions, for example with bromine, well-known chemical reactions (palladium reactions) are used to generate the compounds of the invention. Thus the nature of the invention supports a finding of enablement.

As regards the fifth and sixth factors, the state of the prior art and the relative skill of those in the art, the Examiner will understand that both are high, and thus these factors support a finding of enablement.

As regards the seventh factor, the predictability or unpredictability of the art, the invention relates to the generation of a class of phenanthroline compounds. Having shown that 1,10 phenanthroline can be derivatized at the 3-and/or 8-positions, the applicants submit that a wide variety of compounds are enabled.

Finally, as regards the breadth of the claims, the claims are directed to a class of compounds comprising derivatized phenanthrolines. The applicants submit that the breadth of the claims support a finding of enablement as well.

In conclusion, the specification, taken in conjunction with the state of the art at the time the invention was filed, fully enables one of ordinary skill in the art to make and use the invention without undue experimentation. Thus the Applicants respectfully request reconsideration and withdrawal of the rejection.

The Applicants submit that the claims are now in condition for allowance and an early notification of such is respectfully solicited.

The Commissioner is authorized to charge any additional fees, including any extension fees, which may be required, or credit any overpayment to Deposit Account No. 06-1300 (order No. A63463-1/RFT/RMS/RMK).

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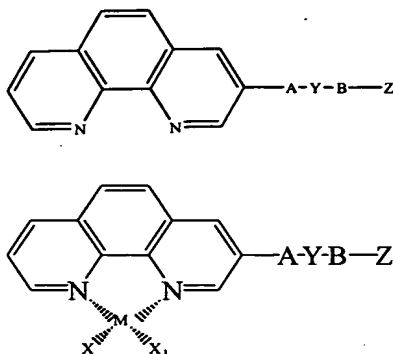
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Dated: 4/18/00

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APPENDIX

44. (Amended) A compound represented by one of the formulae:



wherein

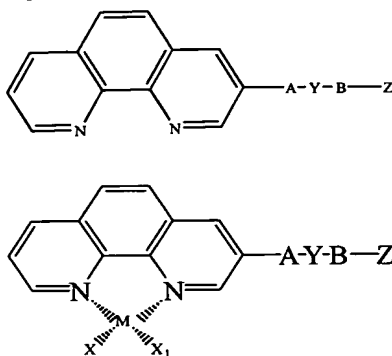
M is a transition metal ion;

the A-Y-B moiety is [acetylene]selected from the group consisting of -C≡C-, -CH=CH-, -N=N-, and -CH=N-;

X and X₁ are co-ligands and wherein at least one of X and X₁ is present; and

Z is a nucleosidyl moiety.

45. (Amended) A compound represented by one of the formulae:



wherein

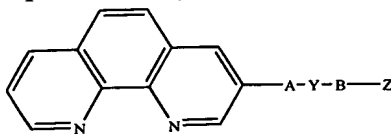
M is a transition metal ion;

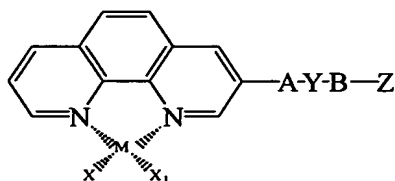
the A-Y-B moiety is [acetylene]selected from the group consisting of -C≡C-, -CH=CH-, -N=N-, and -CH=N-;

X and X₁ are co-ligands and wherein at least one of X and X₁ is present; and

Z is a nucleotidyl moiety.

46. (Amended) A compound represented by one of the formulae:





wherein

M is a transition metal ion;

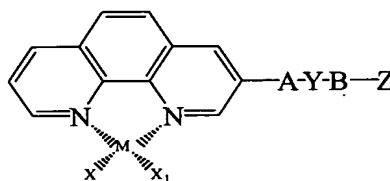
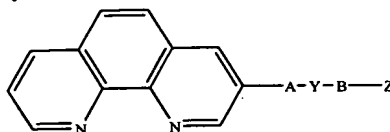
the A-Y-B moiety is [acetylene]selected from the group consisting of -C≡C-, -CH=CH-, -N=N-, and -CH=N-;

X and X₁ are co-ligands and wherein at least one of X and X₁ is present;

and Z is a nucleic acid moiety.

47. A compound according to claim 46, wherein said nucleic acid moiety comprises a nucleic acid analog.

48. A compound represented by one of the formulae:



wherein

M is a transition metal ion;

the A-Y-B moiety is [acetylene]selected from the group consisting of -C≡C-, -CH=CH-, -N=N-, and -CH=N-;

X and X₁ are co-ligands and wherein at least one of X and X₁ is present;

and Z is a phosphoramidite nucleotidyl moiety.

49. A compound according to claims 44, 45, 46 or 48 wherein M is selected from the group consisting of ruthenium, rhenium and osmium.